CLAIMS

What is claimed is:

1. An optical node for processing an incoming optical signal with a plurality wavelengths with each of said plurality of wavelengths having a plurality of signal components in a wavelength division multiplexing (WDM) optical network, comprising:

   a first module for receiving, extracting and processing said plurality of wavelengths;

   a second module with a plurality of input ports and a plurality of output ports for extracting each of said plurality of signal components from said plurality of wavelengths processed by said first module; and

   a third module for routing said plurality of signal components from said input ports to said plurality of output ports in said second module.

2. The optical node of claim 1, wherein the second module and the third module are interconnected via optical transceivers.

3. The optical node of claim 1, wherein the first module and the second module are interconnected via optical transponders.

4. The optical node of claim 1, wherein said processing by said first module provides fiber and wavelength layer functions.

5. The optical node of claim 1, wherein said extracting by said second module provides wavelength to circuit adaptation function.

6. The optical node of claim 1, wherein said extracting by said second module further provides one or more circuit layer functions.

7. The optical node of claim 1, wherein said processing by said third module provides a space switch function.

8. The optical node of claim 2, wherein the optical transceivers comprise a vertical cavity surface emitting laserdiode (VCSEL).

9. The optical node of claim 4, wherein the fiber and wavelength layer functions provided by the first module comprise wavelength multiplexing and wavelength demultiplexing functions.

10. The optical node of claim 4, wherein the fiber wavelength layer functions provided by the first module further comprise wavelength add and wavelength drop functions.

11. The optical node of claim 4, wherein the fiber and wavelength layer function of the first module further comprise a wavelength power balancing function.

12. The optical node of claim 4, wherein the fiber and wavelength layer function of the first module further includes a wavelength dispersion compensation function.

13. The optical node of claim 4, wherein the fiber and wavelength layer function of the first module further comprises a wavelength amplification function.

14. The optical node of claim 4, wherein the fiber and wavelength layer function of the first module further comprises a wavelength protection function.

15. The optical node of claim 5, wherein the wavelength to circuit adaptation function comprises wavelength division multiplexing (WDM) transponding function.

16. The optical node of claim 6, wherein the one or more circuit layer functions comprises a signal regeneration function.

17. The optical node of claim 6 wherein the one or more circuit layer functions further comprises an electrical add and an electrical drop function.

18. The optical node of claim 6, wherein the one or more circuit layer functions further comprises a per circuit performance monitoring function.

19. The optical node of claim 6, wherein the one or more circuit layer functions further comprises a circuit protection function.

20. An optical node for processing an incoming optical signal with a plurality wavelengths with each of said plurality of wavelengths having a plurality of signal components in a wavelength division multiplexing (WDM) optical network, comprising:

a first module for receiving, extracting and processing said plurality of wavelengths;

a second module for extracting each of said plurality of signal components from said plurality of wavelengths processed by said first module; and

a third module with a plurality of input ports and a plurality of output ports for routing said plurality of signal components from said input ports to said plurality of output ports.

21. The optical node of claim 20, wherein said processing by said first module provides fiber and wavelength layer functions.

22. The optical node of claim 20, wherein said extracting by said second module provides wavelength to circuit adaptation function.

23. The optical node of claim 20, wherein said extracting by said second module further provides one or more circuit layer functions.

24. The optical node of claim 21, wherein the fiber and wavelength layer functions provided by the first module comprise wavelength multiplexing and wavelength demultiplexing functions.

25. The optical node of claim 21, wherein the fiber wavelength layer functions provided by the first module further comprise wavelength add and wavelength drop functions.

26. The optical node of claim 21, wherein the fiber and wavelength layer function of the first module further comprise a wavelength power balancing function.

27. The optical node of claim 21, wherein the fiber and wavelength layer function of the first module further includes a wavelength dispersion compensation function.

28. The optical node of claim 21, wherein the fiber and wavelength layer function of the first module further comprises a wavelength amplification function.

29. The optical node of claim 21, wherein the fiber and wavelength layer function of the first module further comprises a wavelength protection function.

30. The optical node of claim 22, wherein the wavelength to circuit adaptation function comprises wavelength division multiplexing (WDM) transponding function.

31. The optical node of claim 23, wherein the one or more circuit layer functions comprises a signal regeneration function.

32. The optical node of claim 23, wherein the one or more circuit layer functions further comprises an electrical add and an electrical drop function.

33. The optical node of claim 23, wherein the one or more circuit layer functions further comprises a per circuit performance monitoring function.

34. The optical node of claim 23, wherein the one or more circuit layer functions further comprises a circuit protection function.

35. In an optical node with a plurality of input ports and a plurality of output ports a method of processing an optical signal with a plurality of wavelengths with each of the plurality of wavelengths having a plurality of signal components, the method comprising the steps of :

inputting said optical signal;

extracting said plurality wavelengths from said optical signal;

extracting said plurality of signal components from each of said plurality of wavelengths;

allocating said plurality of signal components onto said input ports; and

switching said plurality of signal components from said input ports to said output ports;

36. The method according to claim 35, wherein said step of extracting said plurality of wavelengths from said optical signal further comprises the step of amplifying said extracted plurality of wavelengths.

37. The method according to claim 35, wherein said step of extracting said plurality of wavelengths from said optical signal further comprises the step of performing dispersion slope compensation on each of said plurality of extracted wavelengths.

38. The method according to claim 35, wherein said step of extracting said plurality of wavelengths from said optical signal further comprises the step of performing polarization mode dispersion compensation on each of said plurality of extracted wavelengths.

39. The method according to claim 35, wherein said step of extracting said plurality of wavelengths from said optical signal further comprises the step of performing dispersion compensation on each of said plurality of extracted wavelengths.

40. The method according to claim 35, wherein said step of extracting said plurality of wavelengths from said optical signal further comprises the step of monitoring performance of each of said plurality of extracted wavelengths.

41. The method according to claim 35, wherein said step of extracting said plurality of wavelengths from said optical signal further comprises the step of protecting each of said plurality of extracted wavelengths.

42. The method according to claim 35, wherein said step of extracting said plurality of signal components from each of said plurality of wavelengths further comprises the step of performing signal regeneration on each of said plurality of extracted signal components.

43. The method according to claim 35, wherein said step of extracting said plurality of signal components from each of said plurality of wavelengths further comprises the step of monitoring performance of each of said plurality of extracted signal components.

44. The method according to claim 35, wherein said step of extracting said signal components from each of said wavelengths further comprises the step of protecting each of said plurality of extracted signal components.

45. An optical switch node, comprising:

a plurality of port interface circuit card assembles having mounted thereto, a plurality of dense wavelength division multiplexing (DWDM) lasers having a plurality of wavelengths for interconnecting said plurality of port interface circuit card assembles with a switch chassis; and

a plurality of optical transceivers to interconnect said plurality of port interface circuit card assembles with said switch chassis.

46. The optical switch node of claim 45, wherein the plurality of port interface circuit card assembles further comprises a dense wavelength division multiplexing

(DWDM) interface for receiving and processing a plurality of optical channel signals.